30 (new) A vessel wall comprising:

a laterally pressure-loaded reinforced rigid plastic plate;

said plate supported by stiffeners of a vessel having said wall;

wherein said plate has a longer side and a shorter side, wherein said longer side is at least 1.5 times a length of said shorter side, and said rigid plate having at least two reinforcing laminated layers bonded together of substantially unidirectional substantially parallel fibers having predominant orientations that form an angle with said sides of said panel;

said angle between said predominant fiber orientation and the longer side of said panel being between about 55° to 75°; and

approximately one-half of said reinforcing layers of said panel forming a + positive angle between about 55° to 75°, and approximately one-half of said reinforcing layers forming a negative angle between about 55° to 75°, with respect to said longer side of said panel, wherein said panel, when mounted in said vessel wall, is laterally loaded by fluid pressure.

REMARKS

Reconsideration of this application is respectfully requested.

Attached is a declaration from the inventor Rainer Bergstrom who declares that in a laminated panel of fiber layers, the claimed narrow range 55 to 75 degrees for the angle between the fibers of one layer with respect to the fibers of another layer provided unexpected and beneficial results as compared to layers arranged at angles of 90 or 45

degrees. Further, Mr. Bergstrom states that the prior art fiber angle orientations of 0, 45, 90 and 180 degrees would not have suggested to a person of ordinary skill in the art that setting the fiber angle orientations between 55 and 75 degrees. In addition, Mr. Bergstrom states the present invention (wherein fibers are oriented between 55 and 75 degrees) has enjoyed commercial success in the market place over other structural panel products. Commercial success is evidence of non-obviousness. Accordingly, the teaching in the prior art Harpell et al (U.S. Patent No. 5,198,280) of angles of 90 and 25 degrees between fibers of layers of a fabric would not have rendered obvious the narrow range of 55 to 75 degrees claimed in this application.

New claim 30 is supported by the specification at, for example, page 1, lines 4 to 9, which describes a "laterally pressure-loaded reinforced plastic plate" having an "area defined by stiffeners in the hull of a boat, panel."

The rejection of claims 10-23 as being obvious over Harpell et al (U.S. Patent No. 5,198,280) is traversed. The claims distinguish Harpell in several respects including (without limitation):

- A rigid plate for a vessel wall that is laterally loaded by fluid pressure. (Claim 1)(Harpell discloses a flexible fabric for a bullet proof vest.);
- A panel having a side aspect ratio of at least 1.5, which means that the long side of the panel is at least 1.5 times as long as the short side of the panel. (Claim 1)(Harpell does not disclose or discuss any particular side aspect ratio);

- An angle of 55 to 75 degrees between the long side of the panel and the fiber orientation of the panel layers. (Claim 1 and claim 12 requires the angle to be about 60 degrees.)(Harpell discloses an angle of 45 degree and 90 degree).
- Layers bonded together to form the rigid plate. (Claim 1)(Harpell discloses flexible fabric layers that are merely stitched together).

Harpell does not disclose a rigid plate for a vessel wall that is laterally loaded by fluid pressure. Rather, Harpell discloses a "flexible fibrous layers" for a bullet proof body armor. Further, the Action applies the flexible fibrous layers as prior art to support its rejection, and not the generic description of applications for high strength fibers in the prior art section of Harpell. There is no teaching or suggestion in Harpell that the "flexible fibrous layers" are useful as a structural member, such as a vehicle panel. It is improper to apply the flexible bulletproof fabric disclosed in Harpell as teaching the panel recited in independent claim 10. The Harpell flexible layers are not for a vessel, do not form a plastic plate, and would not withstand lateral loading by a fluid.

As its prior art, Harpell (column 1) discloses vehicle panels formed of fibers, but does not suggest that the Harpell stitched flexible fabric be used as rigid panels of a vessel wall. Harpell does not say that its flexible fiber structure should be used as a vehicle panel, as a plastic plate, or be laterally loaded. Indeed, the flexible body armor fabric disclosed in Harpell is not applicable as a structural panel of a vehicle.

Harpell teaches on column 10 (lns. 55-56) that the desired flexibility may vary, makes clear that the product is planned to be flexible. Harpell does not suggest that the fiber layers should be bonded to form a rigid panel for a vessel wall. The various layers

in Harpell are stitched together to maintain flexibility of the fabric. See e.g., Harpell, col. 10, ln. 57 and col. 12, lns. 11-48, and col. 13, lns. 36 et seq. The summary of Harpell makes clear that its disclosed fabric that always comprises of two or more flexible fibrous layers (col. 2, line 28-29; col. 2, line 39; col. 2, lines 52-53). Thus there is no doubt that the purpose of the fibrous layers disclosed in Harpell is to ensure the flexibility of the product. Even the passages on Harpell, col. 10, line 57; and col. 13, lines 35 - 40, to which the Examiner cited, refers to the flexibility of the fabric. Thus, in connection with the fibrous layers 12 of Harpell, the flexibility is the other necessary requirement in addition to the penetration resistance.

Harpell does not disclose a panel having a side aspect ratio of at least 1.5. Harpell is silent of the aspect ratio of panels and provides no hint that the angular orientation of fibers is related to the aspect ratio. The panel elements disclosed in Harpell are flexible fabrics shaped to fit a garment. Harpell shows panels that are more or less square; triangular, hexagonal, and square. Harpell has not taught the effect or understanding of the meaning of the aspect ratio or its relationship to the fiber angle orientations of the layers in the panel. The failure of Harpell to recognize the relationship between aspect ratio and fiber angle orientation is strong evidence of non-obviousness. Applicants recognized that the aspect ratio of a rigid panel influences the optimal angles of fibers in each layer of the panel. In addition, applicants discovered an optimal range of fiber orientations for high aspect ratio panels.

Harpell does not teach an angle for the fibers of each layers of 55 to 75 degrees between the long side of the panel and the fiber orientation of the panel layers. The

angular range of 45 to 90 degrees has been discussed in Harpell only on connection with the flexible fibrous layers 12 (col. 4, line 54). Harpell teaches that the first layer has an angular setting of 0 degrees, the second layer has a setting of + 45°, the third –45°, the fourth + 90°, and the fifth layer 0 degrees. Harpell teaches that there are layers in four different directions, all outside of the narrow range of 55 to 75 degrees set forth in the claims herein. The brief statement in Harpell (col. 4, ln. 45) that the fibers may be oriented "from about 45° to about 90° and in the most preferred embodiments of the invention is about 90°" is contrary to the figures and detailed descriptions in Harpell which only show fiber orientations only at 45° and 90°, and not at angles in between. Further, there is nothing in Harpell to suggest that angles between 45° and 90° should be used for fiber orientations.

Furthermore, Applicants submitted evidence that establishes that the fiber orientation angles are optimum between 55° to 75°. Attached is a declaration of Bergstrom, an inventor, who attests to the unexpected beneficial effect of the narrow range of the fiber orientation for panel having high aspect ratios and that panels with this fiber orientation has been commercially successful as compared to panels with traditional fiber orientations of 45 and 90 degrees. Moreover, the offset angle range of ± 55-75° recited in claim 10 has been demonstrated to provide unexpected and significant benefits, as shown by the test results shown in Figures 3 to 6 of the reports attached to the declaration. Figure 4, for example, shows that by orienting the fibers at an angle between 55-75° with respect to the long side of an elongated panel, superior deflection resistance and failure reduction occur. Harpell provides no suggestion that superior deflection and

failure characteristics are obtained when fibers are oriented at 55-75° with respect to a long side of a panel. The unexpected benefits and commercial success of the invention are additional evidence of non-obviousness. *In re Geisler*, 43 U.S.P.Q.2d 1362 (Fed. Cir. 1997)(a prima facie case of obviousness can be rebutted if the applicant can establish the existence of unexpected properties in the range claimed.); MPEP 2144.05 ("Applicants can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range.").

Harpell's stitched layers are not bonded together by means of bonding the layers to form a laminated panel. As stitching is one way of securing the layers of the Harpell fabric, it is easy to understand that the end product is a flexible garment and not a plastic plate for a vessel wall. While Harpell uses the word "laminate" at columns 4 and 5 for the disclosed flexible armor layers, there is no suggestion that the layers are bonded into a plastic plate panels for use as boat hulls or other vessel walls.

Because Harpell does not teach or suggest a laminated panel for a vessel, a panel having a long side to short side ratio of at least 1.5, or a fiber angle with respect to the long side of 55-75° in each layer of the laminate panel, there is no obviousness.

This application is in good condition for allowance. If any small matter remains outstanding, the Examiner is requested to telephone applicants' attorney. Prompt reconsideration and allowance of this application is respectfully requested.

Respectfully submitted,

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